AMENDMENTS TO THE CLAIMS

This listing of claims replaces all prior listing of claims in this application.

1. (Previously presented) An image device with a photosensor comprising:

at least one isolation trench provided in a substrate having a first conductivity type, said substrate having a first dopant concentration;

a doped region having said first conductivity type surrounding at least a portion of said trench in said substrate, said doped region having a second dopant concentration; and

a photosensitive region formed approximately less than 0.30μ away from the at least one isolation trench and the doped region.

2. (Original) An image device as in claim 1, wherein said trench comprises a dielectric material.

3. (Original) An image device as in claim 2, wherein said dielectric material is selected from at least one of SiO, SiO_2, oxynitride, silicon nitride, and silicon carbide.

4. (Original) An image device as in claim 1, wherein said trench is a shallow trench isolation region.

5. (Original) An image device as in claim 2, wherein said dielectric material is a high density plasma oxide.

6. (Original) An image device as in claim 1, wherein said first conductivity is a p-type conductivity.

7. (Original) An image device as in claim 6, wherein said doped region has an implant dose of from approximately $3.0x10^{11}$ atoms/cm^2 to approximately $3.0x10^{13}$ atoms/cm^2.

8. (Original) An image device as in claim 7, wherein said doped region has an implant dose of from approximately $5.0x10^{11}$ atoms/cm^2 to approximately $6.0x10^{12}$ atoms/cm^2.

9. (Previously presented) An image device as in claim 1, wherein said photosensitive region is a photodiode formed adjacent to said doped region and trench, said photodiode having a p-type region and an n-type region.

10. (Original) An image device as in claim 9, wherein said p-type region has an implant dose of from approximately $3.0x10^{12}$ atoms/cm^2 to approximately $1.0x10^{14}$ atoms/cm^2.

11. (Original) An image device as in claim 10, wherein said p-type region has an implant dose of from approximately $5.0x10^{12}$ atoms/cm^2 to approximately $4.0x10^{13}$ atoms/cm^2.

12. (Canceled).

13. (Previously presented) An image device as in claim 9, wherein said n-type region is approximately 0.15μ to approximately 0.00μ away from said trench and doped region.

14. (Original) An image device as in claim 1, wherein said substrate has a p-type implant concentration of from about $1.0x10^{14}$ atoms/cm^3 to about $1.0x10^{16}$ atoms/cm^3.

15. (Original) An image device as in claim 14, wherein said substrate has a p-type implant concentration of from about $5.0x10^{14}$ atoms/cm^3 to about $3.0x10^{15}$ atoms/cm^3.

16. (Original) An image device as in claim 1, further comprising a p-well region located beneath said trench and doped region, said p-well region having an implant dose of from about $5.0x10^{11}$ atoms/cm^2 to about $5.0x10^{13}$ atoms/cm^2.

17. (Original) An image device as in claim 16, wherein said p-well region has an implant dose of from about $1.0x10^{12}$ atoms/cm^2 to approximately $1.0x10^{13}$ atoms/cm^2.

18. (Original) An image device as in claim 1, wherein said image device is a CCD imager.

19. (Original) An image device as in claim 1, wherein said image device is a CMOS imager.

20. (Original) An image device as in claim 1, wherein said photosensor is one of a photoconductor or photogate.

21. (Original) An image device as in claim 9, wherein said photodiode is a pnp photodiode.

22. (Original) An image structure comprising:

a trench isolation region surrounded at least in part by a first doped region with a first conductivity type having a first impurity implant dose, wherein said first doped region is surrounded by a second doped region of said first conductivity type having a second impurity dose implant concentration; and

a charge collection region with a second conductivity type formed to be approximately less than 0.30μ away from said trench isolation region.

23. (Original) A structure as in claim 22, wherein said first conductivity type is p-type conductivity.

24. (Original) A structure as in claim 22, wherein said first impurity dose implant concentration is in the range from approximately $3.0x10^{11}$ atoms/cm^2 to approximately $3.0x10^{13}$ atoms/cm^2.

25. (Original) A structure as in claim 24, wherein said first impurity dose implant concentration is in the range from approximately $5.0x10^{11}$ atoms/cm^2 to approximately $6.0x10^{12}$ atoms/cm^2.

26. (Original) A structure as in claim 22, wherein said second doped region is a p-well region.

27. (Original) A structure as in claim 26, wherein said second impurity implant dose is in the range from approximately $5.0x10^{11}$ atoms/cm^2 to approximately $5.0x10^{13}$ atoms/cm^2.

28. (Original) A structure as in claim 27, wherein said second impurity implant dose is in the range from approximately $1.0x10^{12}$ atoms/cm^2 to approximately $1.0x10^{13}$ atoms/cm^2.

29. (Original) A structure as in claim 22, wherein said second doped region is a p-type substrate region.

30. (Original) A structure as in claim 29, wherein said second impurity implant concentration is in the range from approximately $1.0x10^{14}$ atoms/cm^3 to approximately $1.0x10^{16}$ atoms/cm^3.

31. (Original) A structure as in claim 30, wherein said second impurity implant concentration is in the range from approximately $5.0x10^{14}$ atoms/cm^3 to approximately $3.0x10^{15}$ atoms/cm^3.

32. (Original) A structure as in claim 22, wherein said first doped region surrounds the sidewalls and bottom of said trench isolation region.

33. (Original) A structure as in claim 22, wherein said second conductivity is n-type conductivity.

34. (Original) A structure as in claim 22, wherein said charge collection region is formed to be approximately 0.15μ to approximately 0.00μ away from said trench isolation region.

35. (Original) A structure as in claim 22, further comprising a pinned surface layer with p-type conductivity formed over said charge collection region, said pinned surface layer is formed with an implant dose of from approximately $3.0x10^{12}$ atoms/cm^2 to approximately $1.0x10^{14}$ atoms/cm^2.

36. (Previously presented) A structure as in claim [[22]] 35, wherein said implant dose is in the range from approximately $5.0x10^{12}$ atoms/cm^2 to approximately $4.0x10^{13}$ atoms/cm^2.

37. (Original) A structure as in claim 22, wherein said image structure is a CCD imager.

38. (Original) A structure as in claim 22, wherein said image structure is a CMOS imager.

39. (Original) A structure as in claim 22, wherein said image structure comprises a photodiode, photogate or photoconductor.

40. (Original) A structure as in claim 22, wherein said image structure comprises a pnp photodiode.

41. (Currently amended) A photodiode structure comprising:

a first doped region having a first conductivity type formed in a substrate, said first doped region being in contact with a second doped region having said first conductivity type, said second doped region formed laterally adjacent to a trench isolation region;

a third doped region with a second conductivity type that accumulates photo-generated charge formed beneath said first doped region and adjacent to said second doped region; and

a fourth doped region having said first conductivity type formed at least in part beneath said second doped region.

42. (Original) The structure of claim 41, wherein said first conductivity type is p- type and said second conductivity type is n- type.

43. (Original) The structure of claim 41, wherein said first doped region has an implant dose in the range from approximately $3.0x10^{12}$ atoms/cm^2 to approximately $1.0x10^{14}$ atoms/cm^2.

44. (Original) The structure of claim 43, wherein said first doped region has an implant dose in the range from approximately $5.0x10^{12}$ atoms/cm^2 to approximately $4.0x10^{13}$ atoms/cm^2.

45. (Original) The structure of claim 41, wherein said second doped region has an implant dose in the range from approximately $3.0x10^{11}$ atoms/cm^2 to approximately $1.0x10^{13}$ atoms/cm^2.

46. (Original) The structure of claim 45, wherein said second doped region has an implant dose in the range from approximately $5.0x10^{11}$ atoms/cm^2 to approximately $6.0x10^{12}$ atoms/cm^2.

47. (Original) The structure of claim 41, wherein said third doped region has an implant dose in the range from approximately $1.0x10^{12}$ atoms/cm^2 to approximately $1.0x10^{14}$ atoms/cm^2.

48. (Original) The structure of claim 47, wherein said third doped region has an implant dose in the range from approximately $2.0x10^{12}$ atoms/cm^2 to approximately $1.0x10^{13}$ atoms/cm^2.

49. (Original) The structure of claim 41, wherein said fourth doped region has an implant concentration in the range from approximately $1.0x10^{14}$ atoms/cm^3 to approximately $1.0x10^{16}$ atoms/cm^3.

50. (Original) The structure of claim 49, wherein said third doped region has an implant concentration in the range from approximately $5.0x10^{14}$ atoms/cm^3 to approximately $3.0x10^{15}$ atoms/cm^3.

51. (Original) The structure of claim 41, further comprising a fifth doped region having said first conductivity type formed at least in part under said second doped region.

52. (Original) The structure of claim 51, wherein said fifth doped region has an implant dose in the range from approximately $5.0x10^{11}$ atoms/cm^2 to approximately $5.0x10^{13}$ atoms/cm^2.

53. (Original) The structure of claim 52, wherein said fifth doped region has an implant dose in the range from approximately $1.0x10^{12}$ atoms/cm^2 to approximately $1.0x10^{13}$ atoms/cm^2.

54. (Original) The structure of claim 41, wherein said first doped region and fourth doped region are electrically connected by said second doped region.

55. (Original) The structure of claim 51, wherein said first doped region and fifth doped region are electrically connected by said second doped region.

56. (Original) The structure of claim 41, wherein said third doped region is a charge collection region formed approximately less than 0.30μ away from said second doped region.

57. (Original) The structure of claim 41, wherein said photodiode structure is part of a CMOS imager.

58. (Original) The structure of claim 41, wherein said photodiode structure is part of a CCD imager.

59. (Original) The structure of claim 41, wherein said second doped region surrounds at least a portion of a trench isolation region.

60. (Original) The structure of claim 41, wherein said photodiode structure is a p-n-p photodiode.

61. (Original) The structure of claim 41, wherein said photodiode structure is an n-p-n photodiode.

Claims 62-133 (Canceled).

134. (Previously presented) A processing system comprising: (i) a processor; and (ii) an imager pixel device coupled to said processor, said imager pixel device comprising a photosensor, said photosensor comprising:

at least one isolation trench provided in a substrate having a first conductivity type, said substrate having a first dopant concentration;

a doped region having said first conductivity type surrounding at least a portion of said trench in said substrate, said doped region having a second dopant concentration; and

a photosensitive region formed approximately less than 0.30μ away from the at least one isolation trench and the doped region.

135. (Original) A processing system comprising: (i) a processor; and (ii) an imager structure coupled to said processor, said imager structure comprising:

a trench isolation region surrounded at least in part by a first doped region with a first conductivity type having a first impurity implant dose, wherein said first doped region is surrounded by a second doped region of said first conductivity type having a second impurity dose implant concentration; and

a charge collection region with a second conductivity type formed to be approximately less than 0.30μ away from said trench isolation region.

136. (Original) A photosensitive pixel comprising:

a p-n-p photodiode comprising an n-type charge collection region formed in a p-type substrate and a p-type surface region located above said charge collection region, said p-type substrate having a first implant dose and said p-type surface region having a second implant dose;

an isolation trench region laterally spaced apart by less than approximately 0.30μ from said charge collection region; and

a doped p-type implant region surrounding at least a portion of said isolation trench region, wherein said doped p-type implant region has a third implant dose.